PROPOSED NORTH AMERICAN GEOLOGIC-MAP DATA MODEL

SCIENCE LANGUAGE TECHNICAL TEAM

Examples of Geologic-map Data-base Queries[1]

13 December, 2001

This document archives hypothetical geologic-map database queries developed by Science Language Technical Team (SLTT) participants as of 30 November, 2001. The queries were developed by SLTT members in order to gain a feeling for the kinds of science concepts and science language that are resident in geologic-map databases, and that might be queried by users of digital geologic-map information.

This document organizes the queries into categories. A companion document ("20_queries_master") archives the submitted queries into a cumulative list without any organizational structure.

The topical structure of this document is not intended to be a definitive classification of database-search categories. Rather, the categories are designed to do several things:

- Bring some organization and structure to the stream-of-consciousness queries in the companion document "20_queries_master";
- Identify some obvious query categories as a step toward discussions of science-language hierarchies;
- Identify some problem areas in classification hierarchies, including some false steps in distinguishing between interpretive features and descriptive features (inappropriate or contradictory mixing of the two);
- Indicate the clear and compelling linkage between lithologic nomenclature and structural nomenclature (as indicated by queries that cross-link between these categories);
- Stimulate discussion about how science language relates to science concepts in databases;
- Stimulate thinking about science-language categories and hierarchies;
- Identify the frequency with which feature-level metadata plays a role in science-language queries;
- Identify the distinction between "data-base queries" and queries that use data-base elements to generate map plots or to evaluate and edit map plots;
- To indicate that some of us may be equating "geologic maps" with "geologic-map data bases".

The document has internal html links that allow you to use the Table of Contents to navigate to specific parts of the document.

[1]This documented should be cited as follows: North American Data Model Steering Committee, Science Language Technical Team, 2001, Examples of geologic-map database queries—organized by categories: Informal document posted to http://geology.usgs.gov/dm/terms/, 62 p.

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TABLE OF CONTENTS

GENERAL QUERIES

Select all bedrock geologic units

Select all surficial geologic units

Select bedrock geology after stripping off Quaternary cover

Select all calderas in the western United States

Select where I should not buy a house

Select all basaltic units, irrespective of their specific petrologic classification based on modal analysis

Select all sedimentary rocks

Select all metamorphic rocks

Select all igneous rocks

Select all granites

Select all gneissose rock, whether metamorphic or plutonic in origin

Select all occurrences of Quaternary units

Select Devonian rocks

Select white rocks

Select the distribution of Paleozoic and older rocks

Select all Mesozoic igneous rocks (or all members of a similar broad age/rock class such as all Mesoproterozoic metasedimentary rocks)

Select the distribution of glauconite-bearing rocks

Select all rock units that include the Oxfordian Stage

What stratigraphic units have been metamorphosed?

Select all outcrops

Select bedrock vs. alluvium

What is the distribution of potential outcrop of the bedrock units?

Is there a surficial geologic map for the area?

What published geologic maps include the area?

A prospective buyer wanted to know if my house is in liquefaction-prone young alluvium or not. I just looked at the State geologic map with Internet Explorer (or MapGuide, or ...) and zoomed in until I could see that it is. This may queer the sale (and I think it is wrong!). If the sale falls through because of this, who do I sue?

Select all Mesoproterozoic rocks (or rocks having any given age range such as Triassic and Jurassic, Cretaceous and younger, or Quaternary)

What rock in a particular region contains the most biotite?

Select the locations of all sites with mineralogic data in section 8, T12N, R3E

How many different rock types are present in a given area?

Select all features related to the Acadian orogeny

Select the distribution of unconsolidated, high-level Pliocene sediments flanking the Scioto River Valley from Columbus to Portsmouth in Ohio

Select geologic units older than Mississippian

Select wells that penetrate to the Precambrian and the type of rock

Select a stratigraphic relationship of all the units exposed in the Grand Canyon and their textual descriptions

Select all national parks in the US containing exposures of Cambrian rocks

Select all sand deposits in California NPS units

Select all oil well locations in Big Southfork NP

Select all abandoned mines in Mojave NP awaiting reclamation

Select an index map listing all the geologic quadrangles at Glen Canyon NRA at 1:24,000 scale

Select all references and map notes that were cited to compile the geology of a certain park

Select a map listing geologic hazard potential in all canyons of Zion NP

Show all Tertiary basin-fill that is dominantly coarse-grained

Select all stratigraphic units at the bedrock surface in quad X

Show me a listing of all previous mapping in and adjacent to quad X

Show me the extent (vertical & horizontal) of unconsolidated deposits

Show areas where good base maps in the form of hypsography, DEM, and Orthophotos are available

What is the local precipitation rate?

What references (geologic reports, master theses, etc...) are available for this area?

What are the rocks in my back yard? (age, unit, lithology)

What is under my house. This would start with the soil under the house, but could extend down to "China"

What rocks (age, map unit, lithology) would you encounter traveling from point A to point B?

How old are the rocks at an arbitrary point?

What are the rocks made of?

How were the rocks made?

What other things are in the rocks? (fossils, minerals, etc.)

How do rocks in an arbitrary area relate to one another?

What can the rocks be used for?

Is there bedrock near the surface or are there unlithified surficial deposits?

How strong are the rocks here?

Where are lithologies (of a specified type) on the map?

Where are mineral assemblages (of a specified type) on the map?

What are the bedding characteristics?

Where are general rock types? Sedimentary, intrusive igneous, extrusive igneous, metamorphic?

How does the lithology vary in time?

What are the (tectonic) pressures and stresses?

What are alternate interpretations of this geology?

Do the map units represent original lithology (protolith), or are they metamorphic rock units?

ALTERATION

Select all areas of altered rock

How extensive is the hydrothermal alteration near ____?

Select areas of sausseritic alteration

Select areas of sericitic alteration

Select areas of propylitic alteration

Select areas of greissinization

How do the rocks break down? (i.e. saprolites)

Select faults that cut hydrothermally altered intrusive rock

Where is the indicator alteration and mineralization suggestive of a particular sort of mineralization (PCD, VMS, epithermal gold, etc.) ?

ANNOTATION DATA POINTS

Select all symbols for overturned syncline

Select all symbols for upright anticline

Select all double-arrow symbols for right-lateral strike-slip faults

Select all bar-and-ball fault symbols

Select line-symbols for “contact, meets the map accuracy standard”

Select all symbols for subsurface-boring locations

Select all plugged and abandoned drill holes and county number for quadrangle X

Select all lithologic symbols and their meaning for quad X

Select all sites where strikes and dips have been taken in quad X

Select all formation symbols in quad X

Select all drill holes for which there is a core in quad X

Select all quarries in quad X

DATASET AND CARTOGRAPHIC MANIPULATION

What written literature is available about the area?

What does this area look like if we simplify the geology?

Can I simplify it in different ways?

Can I define my own simplification scheme?

What are alternate interpretations of this geology?

Create a "lithologic map" by applying a standard or customized lithologic classification

Create a "lithogeochemical map" (showing general lithologic and hydrogeochemical characteristics) by applying a standard or customized reclassification of rock units as in http://water.usgs.gov/pubs/wri/wri994000

Create a "surface materials map," reclassifying surficial deposits (glacial, fluvial, etc.) and bedrock units where surficial deposits are thin or absent, according to material properties (as recently done for Connecticut)

Create a "generalized geologic map" applying a standard or customized grouping of units

Create separate "bedrock" and "surficial" geologic maps, plus a "complete" (combined bedrock + surficial) geologic map

What does the map look like if I make all the Tertiary rocks different shades of orange and brown?

Remove all Cenozoic basin fill units, in their place Select depth to basement (contours or color)

Remove all Cenozoic basin fill units, in their place Select depth estimates and trends based on magnetic and/or gravity analysis

Superimpose all mapped faults, including dip information, in region where Cenozoic basin fill geology has been removed

What rocks in a give area are similar to a specified rock?

What is the geologic description of this unit?

If I specify groupings (e.g., sand + moldic limestone + gravel vs. clay + siltstone), will you draw a map of my groupings?

Select the type section of the ____ unit?

Select all polygons mapped as open water

Select all map units that are mapped as lines only (for example, dikes)

Select all map units that are mapped as both lines and polygons

Select all (sample localities, mines, etc.)

Select a cross section along the line A-A'

Which stratigraphic units have analytical data

Select all references

Select all rock types in a list

Select all cross section index

Select all outcrops with measured sections and age dates

Can you print out the paleontological data for specific sites used in making a map?

Can you draw a marine/nonmarine map for a particular time slice or series of time slices (or limestone/sandstone map, etc.)

Anything to help overcome edge effects/state line faults. (Select all the nonmarine sand of late Paleocene age in Georgia and South Carolina, and when you do, tell the various formation names.)

Expand queries such as the one above (Ok, now Select early Eocene nonmarine sand, and any undated nonmarine sand, too)

Anything to help the user look for patterns in the data (do joints in one part of the map trend one way and in another part of the map trend a different way)

In maps where there is both surficial and bedrock coverage (or any maps where there is more than one coverage), anything to help look for similarities/differences that are related

Select all locations where map unit A has an aspect of 135-270 degrees and a slope of 10-60 degrees

Select all units for which a drainage line also acts as one of the unit's contacts

Select all cross-cutting relationships in streamlined glacial landforms

Select all the rock outcrops that are too small to show as polygons

Select all drill holes in the map area and link to their logs (so I can check a cross section)

Select all units that should have scratch boundaries shown for all or part of the unit

Is there redundancy in the data and why?

What is the volume of basin fill unit A in this region?

Select a geologic cross section across the Black Canyon of the Gunnison River

Select all outcrop photographs available for quad X

Select all stratigraphic cross sections for quads X

Select all references sited for quad X

Select all subsurface datum points in quad X

Select all sites where strikes and dips have been taken in quad X

Select all drill holes for which there is a core in quad X

Show me a list of all stratigraphic units represented in drill core A from quad X

Show me a stratigraphic column of rocks exposed in quad X

Show me a description of all lithologic units in quad X

Develop a list of fossils identified in stratigraphic unit B in quad X

Select all geologic text available for quad X

Display a map showing the sand & gravel deposits in the buried valleys that are deeper that 400 feet beneath the surface

Show the distribution of USCS classifications in the unconsolidated units

Show the extent of unit X in my study area

Show the thickness of unit X in my study area

Show the depth to unit X in my study area

Show the extent of unconsolidated deposits greater than 3 m thick in study area

Derive saturated-thickness maps of aquifers

Show drift-thickness maps

Show areas where good base maps in the form of hypsography, DEM, and Orthophotos are available

Show basin delineations

Query depth to any given formation at a known location

Query what percent of the state is immediately underlain by limestone

Generate isopach maps of specific geologic formations

Generate a map of buried valleys

What is the overburden thickness?

What is the uppermost consolidated formation (or where is this location in the section)?

What were the past land uses of this area?

What are the current land uses of this area?

What references (geologic reports, master theses, etc...) are available for this area?

What is the depth, thickness and potential yield of bedrock aquifers?

What is the thickness of unconsolidated deposits?

List geological age assigned to map units in the selected area

Select cross section lines that intercept folds at their greatest amplitude

Select shorelines with slopes > 35° formed on shale or mudstone

Select paved roads with slopes >2° on mudstone or shale

What would a cross section from an arbitrary point A to an arbitrary point B look like (cross section on the fly)?

Is there bedrock near the surface or are there unlithified surficial deposits?

How thick are the rock units (map units)?

Do the map units represent original lithology (protolith), or are they metamorphic rock units?

ECOSYSTEM AND ENVIRONMENTAL GEOLOGY QUERIES

Select desert tortoise habitat and bedrock sand grain size

Select forest-fire severity and bedrock moisture content

Where are biota dependent on serpentine soils likely to be and with what probability?

Select all surficial deposits with a high/low infiltration rate

ID potential anthropogenic contaminant transport pathways: underground utilities, mine workings, fill areas, wells, surface/ground water control structures, etc

Determine the DRASTIC rating

Show areas of known oilfield/brine contamination at X depth

Are there any know sources of ground-water contamination at this location?

What is the ground-water pollution potential at this location?

Display PHASE I data - proximity to landfills, hazardous-waste generators, underground storage tanks (both active and closed)

Display location of wetlands

Where would a pollution source go if spilled?

ENERGY-RESOURCE QUERIES

Select all oil, gas or coal fields

Select areas underlain by mined-out coal deposits greater than 4 feet in thickness

Select all coal beds

Select the location of all abandoned underground coal mines beneath the Interstate Route 70 corridor from Newark to St. Clairsville in Ohio

Select the distribution of all Upper Freeport coal greater than 36 inches thick in Noble County, Ohio

Select units containing coal seams thicker than one meter located on tribal lands

Select all oil &/or gas wells

Select all oil seeps

identify all polygons that contain sample points with TOC (total organic carbon) attribute values in excess of 1%

identify all polygons that contain sample points with apatite fission-track cooling age values between X and Y Ma

Identify stream segments that cross polygons containing sample points with sulfur attribute values in excess of X%

Identify stream segments that (a) cross formation polygons containing sample points with “oil-stained rock” attribute and (b) are within 0.5 km of topographic relief of at least 100 m

Select rock units in which coal beds are interlayered with sandstone and organic mudrock beds

Select rock units containing petroliferous blebs and (or) stringers

Select all oil well locations in Big Southfork NP

Display all of the Oriskany Sandstone oil & gas fields

Select all the oil & gas fields that have a stratigraphic trapping mechanism

Display a map showing the porosity pinch-out in the Oriskany Sandstone fields

Display all the Knox Dolomite oil & gas fields that have faulting as a trapping mechanism

Display the oil-water contact in the XYZ field

Select all the gas wells whose initial production was greater than 1,000,000 cubic feet and are located within a quarter mile of a fault that is only located within the subsurface

Display a map showing the permeability in the Berea Sandstone fields

Display a map of the second Berea sand in Gallia, Meigs, Athens, Morgan, and Muskingum Counties, Ohio (this example comes from U.S. Geological Survey Professional Paper 259, Plate 2)

Display a map showing extent and thickness of the Berea, Cussewago (Murrysville), and Corry sands in the Appalachian Basin (this example comes from U.S. Geological Survey Professional Paper 259, Plate 1)

Display all the Silurian pinnacle reef oil & gas fields

Select all the oil & gas fields that produce H2S gas

Display the H_2S gas distribution in the XYZ field

Display all the oil & gas fields of the Berea Sandstone that are located within 1 mile of the outcrop

Display a map of the available coal resources of the Bethesda quadrangle

Display a map showing the mined-out resources of the Upper Freeport coal bed in Ohio

Display a map showing sulfur concentrations in the Pittsburgh coal bed

Select all the channel coal locations

Display a map showing the Southern Anthracite coalfield

Display a map of the upper and lower splits of the Middle Kittanning coal bed

Display a map showing the thickness between the upper and lower splits of the Middle Kittanning coal bed

Display a map showing the overburden thickness of the Upper Freeport coal bed

Display the area of the Pittsburgh coal bed underlain by the Pittsburgh sandstone member

Display the measured coal sections in Belmont County, Ohio

Display an Isopach map of the Sharon coal bed

Display a lithofacies map of the Pittsburgh sandstone member

Select all the polygons of the Fishpot coal that are beneath the drainage

Display all the paleochannels that have eroded away the Upper Freeport coal bed

Select all the polygons of the Middle Kittanning coal bed that were deposited in a strandplain/barrier deltaic system

Display a map of partings in the Middle Kittanning coal bed that are composed primarily of sandstone

Display a map of the cleat orientation in the Pittsburgh coal bed throughout Ohio

Display a map of the cleat spacing in the Pittsburgh coal bed through Ohio

Select all producing wells and county number in quad X

Show the distribution of low permeability zones.

Show the unconsolidated units with a high/low total organic carbon content

ID abandoned wells within an area

Calculate maximum sustainable yield (using this geologic-map database and appropriate related databases)

Show areas of known oilfield/brine contamination at X depth

Display oil and gas well locations, depth of completion, stratigraphic name of unit completed within and status

What are coal chemistry and physical characteristics?

GEOCHEMISTRY

Select granites that contain more than 50 ppm whole-rock uranium

Select units with high acid-rock-drainage potential

Select polygons of rock units having acid neutralizing capacity, even if a minor lithology in the unit

Select locations of geochemical analyses of intrusive rocks that are ilmenite-bearing

Select all granitic rocks that have more K2O than Na2O

What is the geochemical signature of this unit?

How can I geochemically differentiate these two terranes?

Select bedrock units where nickel in lake sediments is between 60 and 75 ppm

Select rock units containing elevated rare-earth element abundances

Select rock units with Sr(initial) ratios greater than .706

Generate maps showing spatial variability in aqueous chemistry

What is the water chemistry like (in a specified area)?

What are coal chemistry and physical characteristics?

Are there any chemical analyses available for rocks from the area?

GEO-ENGINEERING

Select surficial deposits having average standard-penetration values less than N=20

Select surficial deposits with a shear-wave velocity less than 200 meters per second

Select all rock units denser than 2.67 g/cc

Select karst deposits underlying trailer parks

Select roads that overlie units with greater than 5% gypsum that are within 150 feet of the surface

Select Franciscan Formation where slope exceeds 20% and annual precipitation exceeds 25 inches

Select areas likely to have poor conditions for building

Is radon gas a problem in this area?

Permafrost is a problem here, how do I know where the safest place to put my pipeline would be?

Where are soils likely to exhibit shrink-swell?

Select liquefiable soils within the 100-year flood plain

What is under my house (or vacation property)? E.g., Rock type? Faults? Anything susceptible to landslides?

Where are slightly consolidated surficial deposits? Moderately consolidated? Well consolidated?

Select all sedimentary units with shear strengths (phi values) less than 35

Select all sedimentary units with cohesive strengths less than 500lb/square ft

Select all bentonite susceptible units that cross major roadways in National Parks (i.e. Mancos Shale)

Select rockfall potential in relation to specific map units

Show me landslides in San Mateo County, California

Show me landslides that directly impact the coastline

Show me all landslides that lie on active faults

Show me all landslides that are larger than 1 km^2 AND have been historically active

Show me the location of all geotechnical borings

Show me the core logs, engineering data, etc for a selected boring(s)

Select all plugged and abandoned drill holes and county number for quadrangle X

Select all drill holes for which there is a core in quad X

Show me a list of all stratigraphic units represented in drill core A from quad X

ID all clay units (vertically and horizontally) with the following criteria: >25 % by weight max. dimension of 0.002 mm; >50 % by weight passing 200-mesh sieve; and have a plasticity index > 10

Show me all slopes with a grade steeper that 6% and the corresponding USCS classification

Show the extent of unconsolidated deposits with a permeability greater than XXX

Show the thickness of unconsolidated deposits with a permeability greater the XXX

Show the extent of rock units with permeability greater than XXX

Show the depth and thickness of rock units w/ permeability greater than XXX

Determine the length (amount) of well casing needed for deposits of a given type

Select all surficial deposits with a high/low infiltration rate

Generate maps showing bore-hole geotechnical data

What well or boring logs are available for this area?

What are the soil types in the area?

Display permeability and (or) hydraulic conductivity information for the selected map units

Display previous well and test-boring data submitted to Division of Water

Select paved roads with slopes >2° on mudstone or shale

What is the permeability of the rocks?

How strong are the rocks here?

What rocks are prone to landslides or slope instability?

GEOLOGIC CONTACTS

Select all (certain, approximate, inferred, concealed, or gradational) contacts

Select all contacts that are mapped as unconformities

Identify lines (including contacts and faults) that separate formation polygons that are not directly adjacent to one another in the map legend

Select all intrusive contacts with evidence of shearing and/or cataclasis

Identify all formation polygons whose contact with immediately younger formation polygons defines a closed line segment

Identify all contacts that meet the map-accuracy standard

Identify all sedimentary contacts

Identify all sedimentary contacts that overlap the XYZ granite

Identify all contacts where the geologist is not certain whether the planar feature is a contact or a fault

Identify all contacts whose location meets the stated map-accuracy standard

Identify all sedimentary contacts formed during the Kaskaskia onlap sequence

Identify all igneous contacts formed during the late Cretaceous part of the Laramide Orogeny

Select all gradational contacts separating marine and terrestrial sediments

Select all contacts that are mapped as unconformities

Display all the contacts of the sand & gravel units that are in contact with the carbonate bedrock units

Select all landslide contacts

GEOLOGIC HAZARDS

Select rockfall potential in relation to specific map units

Show me landslides in San Mateo County, California

Show me landslides that directly impact the coastline

Show me all landslides that lie on active faults

Show me all landslides that are larger than 1 km^2 AND have been historically active

Select Franciscan Formation where slope exceeds 20% and annual precipitation exceeds 25 inches

Select all bentonite susceptible units that cross major roadways in National Parks (i.e. Mancos Shale)

Where are soils likely to exhibit shrink-swell?

Permafrost is a problem here, how do I know where the safest place to put my pipeline would be?

Show me urban areas that are built on artificial fill

Show me areas that are highly susceptible to earthquake-induced liquefaction

Show me the areas in Hawaii at risk from large tsunamis

ID potential anthropogenic contaminant transport pathways: underground utilities, mine workings, fill areas, wells, surface/ground water control structures, etc

Are there hazards related to the geology?

Are there faults in the area? Are they active or inactive?

What rocks are prone to landslides or slope instability?

Do limestones form karst terraines? If so what is the sink-hole density?

A prospective buyer wanted to know if my house is in liquefaction-prone young alluvium or not. I just looked at the State geologic map with Internet Explorer (or MapGuide, or ...) and zoomed in until I could see that it is. This may queer the sale (and I think it is wrong!). If the sale falls through because of this, who do I sue?

GEOLOGIC STRUCTURE

Broad structural queries

Display the metamorphic isograds

What are the major terrane boundaries and structures in the area?

What are the (tectonic) pressures and stresses?

How thick are the rock units (map units)?

Are there linear features on the map?

How strong are the rocks here?

Select stations at which multiple structural orientations are recorded

Select attitude symbols of nth generation

Select all strike & dips and other geologic symbols

Select all paleostress indicators within 20 degrees of east-west orientation

Select allochthonous rocks in the area

Select all faults and contacts that separate bedrock from basin fill

Select all locations where map unit A has an aspect of 135-270 degrees and a slope of 10-60 degrees

Select all rocks that are part of a thrust plate

Select all the clastic rocks that are not carbonate and that are part of a thrust plate

Select places where Proterozoic clastic rocks are in the upper plate of a low-angle normal fault

Select places where welded tuffs are cut by normal faults having greater than 100 m offset

Select all carbonate rock that has been tectonically brecciated. (Again, this is an important question, that would rely on some sort of uniform criteria for characterizing "tectonic brecciation" -- otherwise it becomes highly subjective)

Select mapped faults in Tertiary rocks that correspond to steep gradients in gravity or magnetic data

Show me structural contours of stratigraphic unit B in quad X

Show basin delineations

Query depth to any given formation at a known location

Generate isopach maps of specific geologic formations

Generate a map of buried valleys

What is the overburden thickness?

What is the depth, thickness and potential yield of bedrock aquifers?

Select domains in which vertical planes extending 90° from fault traces would show faults cutting hanging-wall bedding at angles between 75° and 90°

What would a cross section from an arbitrary point A to an arbitrary point B look like (cross section on the fly)?

How do rocks in an arbitrary area relate to one another?

Have the rocks in an arbitrary area been moved since they were formed? (faulted or tilted)?

How deep is bedrock?

How deep is the metamorphic basement?

What are the geologic-map constraints on the ages of faults?

What is the structural relief on the top of the lower Pleistocene?

Display segments of the Vincent-Orocopia-Chocolate Mountain thrust system that were re-activated by Oligocene-Miocene extension

Linear Geologic Structures

Are there linear features on the map?

Select linear symbols that intersect with planar symbols

Select lineation and foliation measurements that were measured together as pairs on a single foliation surface

Select slickenside lineations

Select slickenside lineations trending between 045 and 115

Select slickenside lineations on low-angle normal dip-slip faults

Select lineations created by crushing and streaking of mineral grains

Select stretching lineations

Select L2 minor-fold lineations

Select paleocurrent lineations between 115 and 180

Select sole-mark lineations between 115 and 180

Show all faults having slickenline (slickenside striation) rakes ranging from (greater than, lesser than) __° to __°

Planar Geologic Structures

Select all kinds of planar point features

Select planar symbols that intersect with other planar symbols

Bedding planes

Select upright bedding attitudes with dips greater than 45 degrees

Select polygons of unit XYZ where sedimentary bedding is overturned beneath thrust faults of mid-Tertiary age

Select polygons in which the XYZ shale dips northwestward greater than 25 degrees on slopes steeper than 10 degrees

Select locations of shale where bedding dips greater than 30 degrees in the downhill direction

Identify pairs of strike/dip symbols for which the distance between symbols is less than 1 km and for which minimum difference in dip directions is at least 120 degrees

Select all strike & dips and other geologic symbols

Select bedding measurements for which tops are known

Create a 1 km buffer around strike/dip symbols characterized by dips greater than 45 degrees

Select overturned beds

Select linear symbols that intersect with planar symbols

Select units with sedimentary rocks that dip more than 25 degrees

Select units where the Tyee Sandstone is dipping west

Select the attitude data for all sedimentary units that have a bed thickness less than 1 foot

Select areas where steeply dipping sedimentary rocks are buried beneath less than 3 m of unconsolidated sediments

Select all areas where reversal of dip direction within Pliocene sandstones occurs within 1 km

What facing indicator induced the geologist to put a ball on the end of the strike line?

Does a ball on the end of the strike line mean a facing indicator was observed and interpreted confidently?

How confident is the interpretation of facing direction at this site?

Select regions where Tertiary rocks dip steeply (greater than 60°, for example) to the west

Select all sites where strikes and dips have been taken in quad X

What is the bedrock orientation (strike and dip) at this location?

Select largest possible domains with dip-direction variations less than 90° where dips are toward a fault plane

Select largest possible domains with opposite (>180°) stratal and foliation dip directions

Select domains less than 10 km^2 with opposite along-strike dip directions

Fault planes

Select fault scarps that slope 15 to 25 degrees in playa deposits

Select all historically active faults

Select the location of all mapped faults with Holocene displacement

Select thrust faults of the Penokean orogen

Select thrust faults of the Penokean orogeny that were reactivated during the Mid-continent rift

Select low-angle faults that are extensional in origin

Select units with shear zones

Select units with shear zones and silicic plutonic rocks

Select maximum areal limits within which the surface trace of a specified fault could lie

Select 90% confidence limits on the location of a specified fault

Identify all faults whose location meets the stated map-accuracy standard

Select reverse faults that cut Neogene deposits

Select all areas of fault breccia

Select faults of nth generation

Select hanging-wall rock units where Mesozoic 2-mica granites intrude metacarbonate rock

Select all (upright, overturned) (synclines, anticlines)

Select all (certain, approximate, inferred, or concealed) faults(folds,)

Select all Cretaceous and Cenozoic faults, classified according to relative movement (low-angle thrust, steep normal or reverse, sinistral or dextral strike-slip, etc.)

Select all faults, shear zones, and rock units characterized by mylonitic fabrics

Select all rock units in and adjacent to the Brevard and Mountain Run fault zones (or other named fault zones), or all faults of the Stafford fault system (or other named fault system)

Select all Paleozoic thrust faults (or other faults of specified age and type)

Select all normal and reverse faults in contact with stratified units of Triassic or Jurassic age; or all faults that offset Cretaceous and younger units

Select thrust faults that overlie Mesozoic shale

Select faults of regional extent that have gold occurrences

Select strike-slip faults that have known sinistral movement between 450 and 423 Ma

What kind of fault rocks occur along this fault?

Select blind thrust faults that will produce a magnitude 6 or greater earthquake in the next 30 years

Select all faults that dip 60 degrees or greater

Select all listric faults

Select thrust faults that are reactivated Miocene normal faults

Select all inferred faults within Quaternary alluvium based on analysis of water levels

Select right-lateral strike-slip faults with 1 km or greater offset

Select right-lateral strike-slip faults with unknown amount of offset

Select all faults with evidence of movement during the Holocene

Select all faults that coincide with alignments of seismicity

Select faults having known or suspected Holocene and Pleistocene movement

Select faults younger than 28 Ma

Select surficial deposits younger than 250,000 years that are cut by thrust faults

Identify all thrust faults whose strike is between 80 and 110 degrees and whose vergence is south

Select all faults (by type)

Select faults having a NW-SE trend

Select fault scarps buried by < 3m of material

Select named faults

How much field investigation was focused in this particular fault intersection?

Select faults that perturb shallow ground-water flow enough to enhance vegetation

Select faults that perturb shallow ground-water flow enough to form springs

Select faults active during the middle Pleistocene

Is this site within 50 km of a Quaternary fault?

Select all [map] units for which faults act as unit boundaries

Select anywhere faults seem to have a circular pattern (or where clustered faults seem to have a lack of preferred orientation)

Identify lines (including contacts and faults) that separate formation polygons that are not directly adjacent to one another in the map legend

Select all low-angle faults, whether contractional or extensional

Select thrust faults that have been folded

Select Cretaceous thrust faults that were reactivated in Eocene time

Select segments of the Vincent-Orocopia-Chocolate Mountain thrust system that were re-activated by Oligocene-Miocene extension

Select all high-angle faults within 2 km of the Wasatch Mountain front that have a rake of 45 to 60 degrees

Select faults that offset only the youngest alluvium

Select all faults that truncate or offset faults of late Pliocene or younger origin.

Select all faults with damage zone wider than 2 m where the damage zone is not plugged

Select all faults with trace lengths greater than X km

Select all faults that have offsets greater than X m

Select all strike-slip faults

Select all normal faults with dips greater than 50 degrees

Select all faults oriented between N10E and N70E

Select traces of low-angle normal faults that have metamorphic rocks in their lower plate

Select places where welded tuffs are cut by normal faults having greater than 100 m offset

Select mapped faults in Tertiary rocks that correspond to steep gradients in gravity or magnetic data

Select all normal faults with hanging wall damage zones wider than 100 m

Select faults that bound intrusive bodies and/or extend from faulted contacts of intrusive bodies

Select faults that cut hydrothermally altered intrusive rock

Select faults that intersect the boundaries of intrusive bodies

Select faults that terminate at detachment surfaces at angles greater than 20°

Select faults that cut detachment surfaces

Select faults across which footwall rocks dip steeper than hanging-wall rocks

Select largest possible domains with dip-direction variations less than 90° where dips are toward a fault plane

Select domains in which vertical planes extending 90° from fault traces would show faults cutting hanging-wall bedding at angles between 75° and 90°

Show all normal faults(also dextral strike-slip, sinistral strike-slip, reverse, thrust, oblique-slip)

Show me all faults having slickenline (slickenside striation) rakes ranging from (greater than, lesser than) __° to __°

Show me all faults having dips (strikes) ranging from (greater than, lesser than) __° to __°

Display segments of the Vincent-Orocopia-Chocolate Mountain thrust system that were re-activated by Oligocene-Miocene extension

Display Cretaceous thrust faults that were reactivated in Eocene time

Are there faults in the area? Are they active or inactive?

What are the geologic-map constraints on the ages of faults?

Which faults are the oldest?

Display thrust faults that have been folded

Display all low-angle faults, whether contractional or extensional

Fold-axial planes

Select all (certain, approximate, inferred, or concealed) folds

Select named folds

Select all folds (by type)

Select folds of nth generation

Select fold-axial planes overturned to the SW

Select all anticlines in quad X

Select axial plane traces that curve through more than 20° of arc

Show traces of axial planes with more than 20° of curvature

Select cross section lines that intercept folds at their greatest amplitude

Foliation planes

Select foliation within non-metamorphic units

Select foliation and lineation measurements that were measured together as pairs on a single foliation surface

Select all Paleozoic intrusive rocks grouped according to symbols distinguishing magmatic flow foliation and regional foliations

Select largest possible domains with dip-direction variations less than 90° where dips are toward a fault plane

Select largest possible domains with opposite (>180°) stratal and foliation dip directions

Select domains less than 10 km^2 with opposite along-strike dip directions

Select domains of metamorphic rock in which the attitude of foliation is < 20° from the attitude of contact with next oldest unit

Fracture planes

Select units with joints or fractures with less than 2-meter spacing

Select northeast-oriented fractures without calcite fill

Select the location and orientation of all mapped bedrock fractures in Summit County, Ohio

Where is fracture density of surface rocks great enough to significantly enhance hydraulic conductivity?

Select all hard rocks with close fracture spacing

Select surficial deposits having fractures that are partly closed by caliche

Select surficial deposits having open fractures striking between 045 degrees and 090 degrees, with fracture spacing denser than 1 fracture per meter

Show the regional joint and fracture patterns in the consolidated units

Show the extent of fractured rock in study area

Show the fracture-trace/orientation of fractures in unit

Show areas where fracturing in till is known or suspected

Select for known fracture patterns and indicate the orientation of those fractures

For the selected region, are there any major bedrock fractures or karst features that would affect ground water flow?

Are the rocks fractured?

What are the fractures like? (Open or closed)

Joint planes

Select units with joints or fractures with less than 2-meter spacing

Select 20 to 30 Ma lacustrine limestones that have orthogonal joint sets

Show the regional joint and fracture patterns in the consolidated units.

GEOMORPHOLOGY

Select fault scarps that slope 15 to 25 degrees in playa deposits

Select late Pleistocene shorelines of Lake Bonneville

Select inner-gorges

Select areas underlain by shale where 30-m DEM data define a surface roughness value in excess of (some threshold value)

Select the location of all buried valleys in Shelby County that are filled with Pleistocene sand and gravel

Select the bedrock topography of Williams County, Ohio

Select the location of all probable karst areas of western Ohio

Select the location of all till bluffs over 15 feet high along the Lake Erie coastline

Select all terraces

What orientations are caves likely to have in carbonate deposits of XYZ mountains?

Where are biota dependent on serpentine soils likely to and with what probability?

Select areas whose patterns resemble dunes along major east-west rivers of the High Plains

Select sinkholes in section 12 and calculate the mean, median and mode of their diameters

Select playas in Hale Co., Texas and fit them to a drainage pattern

Select drainage patterns and fit to regional lineaments (or regional structural trends)

Select all wetlands

Select all occurrences of glacial striae superimposed on bedrock

Select the location of slope-movement scarps where dips in the Reedsville Shale are greater than 25 percent

Select all slope-movement scarps only on residual soil

Select the location of slope-movement scarps on southwest-facing, treeless slopes

Select all (certain, approximate, or concealed) (caldera boundaries, landslide scarps, etc.)

Select all iceberg scours on the continental shelf and on the bed of Glacial Lake Agassiz

Select all the eskers

Select all the glacial striae and glacially streamlined landforms

Select all sites with more than one set of glacial striae

Select all the glacial lake and raised marine shorelines

Select the all-time glacial limit in northwestern North America

Select the location of all terraces > 3m above the flood plain

Select areas having steep terrain

Select spatial patterns of crestlines for Holocene barchan dunes

Select recent shorelines to show dune migrations and beach erosion at North Carolina's Outer Banks

Select all marine terraces 20 to 80 m above sea level that have reliable U-series dates < 130 ka

Select areas where younger alluvial fans slope more steeply than older ones

Select all calderas in the western United States

Show me areas of high relief on the seafloor (i.e., rugged bathymetry)

Select the location of slope-movement scarps where dips in the Reedsville Shale are greater than 25 percent

Select all slope-movement scarps only on residual soil

Select the location of slope-movement scarps on southwest-facing, treeless slopes

Select all (certain, approximate, or concealed) (caldera boundaries, landslide scarps, etc.)

Select late Pleistocene shorelines of Lake Bonneville

Select spatial patterns of crestlines for Holocene barchan dunes

Select spatial patterns of crests of Pleistocene terminal moraines

Select spatial patterns of crests of Pleistocene lateral moraines

Select ground fissures

Select crown scarps for landslides

Select recent shorelines to show dune migrations and beach erosion at North Carolina's Outer Banks

Display a map showing all the eskers

Find all the Pleistocene beach ridge sands that overly outwash sands & gravel
Display a map showing Pleistocene beach ridges that come in contact with the Lake Erie shoreline

Display a map showing all the end moraines

Display a map showing all the Wisconsinian-age Alluvial terraces

Display a map showing all the Pleistocene beach ridges bordering Lake Erie

Display a map showing the Powell end moraine

What is the extent of a specific watershed? (How does my target property fit within the distribution of the watershed?)

Generate maps of gaining or losing streams

What are the nearest surface water bodies?

Calculate proximity to surface waters

Display location of wetlands

Select shorelines with slopes > 35° formed on shale or mudstone

Select bedrock mountain fronts with slopes > 35° more than adjacent piedmont slopes formed on surficial deposits

How do the rocks break down? (i.e. saprolites)

What drainage patterns do the rocks form?

Do limestones form caverns? If so how large?

Do limestones form karst terraines? If so what is the sink-hole density?

Where are springs located?

What is the erosional history of this region?

GEOPHYSICS AND PALEOMAGNETISM

Select all reversely-magnetized basalt flows that are younger than 10 Ma

Select outcrops that correspond to magnetic anomalies with amplitudes of 100 nT and greater

Select outcrops of turbidites that correspond to magnetic anomalies with amplitudes of 100 nT and greater

Select all contacts and faults in white on top of this geophysical grid

Select all aeromagnetic survey flight lines over the geologic map of this region. Code line colors according to survey altitude and/or survey date (or ID)

What is the bulk mean density of map unit A? (bulk mean density could be replaced by any physical property)

Produce a file of all gravity measurements from map unit A in the given region. This file must contain XYZ information as well as metadata

Select contours of the Bouguer gravity anomaly map over this region of the geologic map

Select aeromagnetic data of selected flight line centered on its flight line superimposed on the geologic map

Select ground based magnetic survey location information. Select data projected to a straight line between selected endpoints. Calculate textural properties (fractal dimension) in the region overlain by map unit A

Generate a map where wavelet (A) Selects a correlation of 0.75 or greater with the magnetic anomaly map. Overlay mapped faults. Overlay mapped intrusives, dikes, and sills with a magnetic susceptibility greater than 0.005

Select reversely polarized early Pleistocene basalt

Select where the geothermal gradient exceeds 4.0 degrees C when it intersects Pennsylvanian shales

Select mapped faults in Tertiary rocks that correspond to steep gradients in gravity or magnetic data

HYDROGEOLOGIC QUERIES

Where do sandstone aquifers come to the surface?

Select all areas that have impermeable deposits within 2 m of the surface and slopes less than 3%

Select all locations where the water table is within 20m

Select all sedimentary rocks that are porous and permeable

How deep do I have to drill my [water] well?

Find all water wells that are found at the surface in “sequence A” of basin fill material

Find all water wells that may intersect “sequence A” at 100m depth”. What is the spatial variation (semi-variance?) in particle size distribution, cementation, (and possibly) porosity, and permeability of basin fill unit A?

Show the regional water table and corresponding formation. Is it structurally or stratigraphically controlled?

Show me the distribution of low permeability zones

Plot the distribution of ground water wells within an area. In which units are the wells screened?

What are the sustainable yields of the formations intersected by the wells?

Show the depth to ground water in unit X in study area

Show the depth to and thickness of clay units with permeability less than XXX

Display facies changes in formations/aquifers

Show perched water zones. Are they stratigraphically controlled?

Show me formations that have sustainable ground water yields greater than 10 gpm. How extensive are they?

Show me the distribution of low permeability zones

Show the extent of clay units having permeability less than XXX

Show the extent of rock units having permeability greater than XXX

Show the depth and thickness of rock units having permeability greater than XXX

Show the extent of units identified as regional and local aquifers

Confined aquifers and depth to confining units

Select high-yielding well locations for wells completed in a particular aquifer

Select all producing wells and county number in quad X

Select all surficial deposits with a high/low infiltration rate

Show me the distribution of low permeability zones.

What is the extent of a specific watershed? (How does my target property fit within the distribution of the watershed?)

Historically, what is the seasonal fluctuation of the ground water table? How has this fluctuation changed over time?

ID regional ground water recharge and discharge areas

ID abandoned wells within an area

ID potential anthropogenic contaminant transport pathways: underground utilities, mine workings, fill areas, wells, surface/ground water control structures, etc

Calculate the amount of available recharge (using this geologic-map database)

Determine the DRASTIC rating

Calculate maximum sustainable yield (using this geologic-map database and appropriate related databases)

Show areas having flowing (artesian) wells

Show confined aquifers and display depth to confining units

Show areas where till, surficial deposits are believed to be saturated below X feet

Show historic potentiometric surface maps derived from a point coverage of well-log data for wells drilled within a certain time period

Show high-yielding well locations for wells completed in a particular aquifer

Generate derivative maps showing extent of areas served by private water systems and other wells within those areas to assist in determining ground-water stress areas

Derive saturated-thickness maps of aquifers

Generate maps of gaining or losing streams

Show aquifer-extent delineations

Delineations of confined and unconfined aquifers

Generate maps showing spatial variability in aqueous chemistry

Generate maps showing hydraulic conductivity and specific capacity

Generate maps showing soils and soil infiltration rates

Generate maps showing the elevations of springs

Generate maps showing vadose materials

Generate maps showing recharge and discharge areas

Query deepest underground source/formation of potable ground water

Query what the recharge rate is for a particular area

Display extent of known cones of depression

Display ground-water velocity fields

Display vertical hydraulic conductivity of surficial till deposits

What are the aquifer properties (transmissivity or hydraulic conductivity) of the upper 100 feet of material at this location?

For the selected region, are there any major bedrock fractures or karst features that would affect ground water flow?

Where are the ground-water users in this area?

Are there any know sources of ground-water contamination at this location?

What is the ground-water pollution potential at this location?

What are the nearest surface water bodies?

Where is the closest stream-gauging station?

Where is the closest government observation well?

What is the depth to ground water?

What is the ground water flow direction?

What is the depth, thickness and potential yield of unconsolidated sand and gravel aquifers?

What is the depth, thickness and potential yield of bedrock aquifers?

Display permeability and (or) hydraulic conductivity information for the selected map units

Calculate proximity to surface waters

Display location, production, and unit completed within for private wells, public wells, and industrial wells

Display wellhead-protection areas

Display reservoir protection areas

Display sole-source aquifer locations

Display PHASE I data - proximity to landfills, hazardous-waste generators, underground storage tanks (both active and closed)

Display previous well and test-boring data submitted to Division of Water

Display location of wetlands

How deep is it to the water table(s)?

What is the permeability of the rocks?

Is the ground water being recharged?

Where would a pollution source go if spilled?

What rocks are considered aquifers?

What are the water-bearing characteristics of the rocks?

What is the water chemistry like (in a specified area)?

Is the ground water (in a specified area) potable?

How deep is saline water? (Close enough to the surface to cause water well problems?)

Where are springs located?

What is the movement of groundwater and other fluids?

IGNEOUS ROCKS

Age

Select all granites and granodiorites of Mississippian, Pennsylvanian, and Permian age, showing sample locations and references for U-Pb zircon dates by ion microprobe (from national geochronological database)

How was the age of this unit determined?

Select all Paleozoic intrusive rocks grouped according to age, as well as symbols distinguishing magmatic flow foliation and regional foliations

Select areas where 12 to 17 Ma old welded ashflow tuffs contain chloritized conglomeratic clastic dikes

Rock type (classification)

Select all igneous rocks

Select areas where 12 to 17 Ma old welded ashflow tuffs contain chloritized conglomeratic clastic dikes

Select all charnockites and granulite-facies metamorphic rocks

Select all basaltic units, irrespective of their specific petrologic classification based on modal analysis

Select all granites

Select all hypersolvus granites

Select all andesitic and basaltic volcanic rocks

Select Neogene basalt units adjacent to rivers

Select rhyolite dikes

Select all hornblende-bearing plutonic rocks

Select all subvolcanic intrusive rocks

Select all syenitic rocks

Select all Proterozoic rock units that are part of a mangerite-jotunite complex

Select the location of all known kimberlites

Outcrop geomorphology

Select plutonic rock units that have exfoliating structure

Select plutonic rock units that weather into tors

Lithology (physical description) and composition

Select units where basic igneous rocks dominate

Select units with ultrabasic rocks as a component

Select areas where 12 to 17 Ma old welded ashflow tuffs contain chloritized conglomeratic clastic dikes

Select all occurrences of obsidian that are not devitrified

Select calc-alkaline igneous rocks

Select units with shear zones and silicic plutonic rocks

Select Early Proterozoic bimodal volcanic rocks deposited in a backarc basin environment

Select Early Proterozoic volcanic rocks and locate the massive sulfide deposits in them

Select granites that contain more than 50 ppm whole-rock uranium

Select volcanic deposits that are highly weathered and easily excavatable

Select all intrusive rocks that are ilmenite-bearing

Select all intrusive units that are inferred to be ilmenite-bearing

Select all granitic rocks that have more K2O than Na2O

Select Neogene basalt units adjacent to rivers

Select rhyolite dikes

Select all hornblende-bearing plutonic rocks

Select all subvolcanic intrusive rocks

Select all syenitic rocks

Select all granitoid rocks that are stained brownish-red, whether or not the stain is understood in terms of its mineralogy or its geochemistry

Select all basalt that has pillows

Select granodiorite that contains inclusions of any kind

Select granodiorite that contains equidimensional inclusions

Select granodiorite that contains flattened and aligned inclusions

Select all intrusive rocks that have schlieren

Select all plutonic felsic rocks that have porphyritic textures with a fine-grained groundmass

Select all plutonic felsic rocks with 2 micas

Select all plutonic felsic plutons that are polyphase or zoned

Select all Phanerozoic mafic to ultramafic plutonic igneous rocks associated with calc-alkalic convergent margin magmatism that have cumulate textures

Select all Archean and Proterozoic mafic to ultramafic plutonic igneous rocks that have cumulus layering, particularly cyclic units or macrorhythmic layering

Select all tectonized harzburgites that are part of an ophiolite assemblage

Select all pillow lavas associated with the Coast Range ophiolite

Select all tuffs associated with the Thunder Mountain caldera in Idaho, distinguishing those that are intracaldera from those lying outside the caldera margin

Show all densely welded (or moderately welded, or nonwelded) tuffs. (To answer this question, variations in the degree of welding would need to be attributed within all of the tuff units on a map.)

Genetic structures

Select all intrusive rocks that are flow-foliated

Select all Paleozoic intrusive rocks grouped according to symbols distinguishing magmatic flow foliation and regional foliations

Select all intrusive rocks that are flow-lineated

Select all vitric rocks.

Select all the crystalline rocks with a fracture density > X% and within X m of the land surface.

Petrography and mineralogy

Select all intrusive igneous rock units that contain magmatic hornblende

Select all intrusive igneous rock units that contain magmatic muscovite

Select all extrusive igneous rock units that contain sanidine

Select all porphyritic plutonic rocks

Select all equigranular plutonic rocks of tonalitic composition

Select all rapakivi-textured hypabyssal and plutonic rocks

Select all rapakivi-textured plutonic rocks

Select all porphyritic plutonic rocks where K-spar is the phenocryst

Select all intrusive rocks with plagioclase composition An30-An40

Select all volcanic rocks having ophitic texture

Stratigraphic relations

Select all intrusive contacts of late Cretaceous age

Select granitic intrusions into limestone

Select granitic intrusions into limestone that are associated with skarn occurrences

Select all intrusive contacts

Select all the crystalline rocks with a fracture density > X% and within X m of the land surface

Select faults that bound intrusive bodies and/or extend from faulted contacts of intrusive bodies

Genesis and origin

Select all intrusive igneous rock units

Select all intrusives/extrusives

What is the sequence of intrusive events?

Select all flood basalt

Select all intrusive rocks that are foliated

Select areas of plutonic intrusions, divided into mafic, felsic and intermediate

Select all volcanic deposits

Select all pumice deposits

Select all pyroclastic flow deposits

Select all lava flow deposits

Select all dome deposits

Select all recent volcanic eruptions and flows (< 2000 years ago)

Select all tuffs associated with the Thunder Mountain caldera in Idaho, distinguishing those that are intracaldera from those lying outside the caldera margin

Tectonic or paleogeographic setting

Select Early Proterozoic bimodal volcanic rocks deposited in a backarc basin environment

Select volcanic rocks formed in island-arc settings

Select plutonic rocks formed in anorogenic continental-interior settings

Select synorogenic plutonic rocks

Select synorogenic plutonic rocks of Andean-margin type

Select synorogenic volcanic rocks in the upper plate of Tertiary detachment faults

Select synorogenic volcanic rocks in Miocene extensional nonmarine basins

ISOTOPE GEOLOGY AND THERMOCHRONOLOGY

Are there any age dates available for any of the rocks in the area?

Select all intrusive igneous rock units with published U-Pb zircon ages

Select all intrusive igneous rock units with U-Pb zircon ages published after 1990

Select all extrusive igneous rock units with sanidine 40Ar/39Ar ages published after 1985

Select all units having radiometric-age data

How was the isotopic age of this unit determined?

Who did the ages on the ____ pluton and are they any good?

What is the material investigated (rock type, mineral, liquid, gas)?

Where is the material from (lat. long.; range township, section, location map)? Is the age of the material known?

Were data generated in more than one laboratory (chemical lab, isotope lab, wet chemistry, dry chemistry, etc.)

What is the element(s) investigated?

What kind of isotope(s) is reported (radiogenic, stable)?

What techniques were used to determine elemental abundances?

What techniques were used to determine isotopic abundances or ratios?

Were initial isotopic ratios calculated for radiogenic isotopes?

How was age of material determined?

Are age determinations available from different techniques and/or isotope systems?

Are ages by different techniques the same or different?

if different, is it known why (geologic factors, analytical factors)?

What are the precisions of the measurements?

What are the accuracy's of the measurements?

when were initial radiogenic isotope ratios calculated (decay constants and isotopic abundances used)?

Who and/or what are the sources of data (references, written communication, rumor, guess, plagiarized)?

Are there other chemical or isotopic data elsewhere for materials in data base?

Where are additional data available (library, Internet, internal memo, rumor, etc.)

Why was the work done (is there a problem)?

Where are radiometric ages in "this" unit (and only this unit)?

Select locations of all samples dated by the U/Pb method using the mineral titanite and returning an age between 1345 and 1326 Ma

Select U/Pb age determinations performed at the Royal Ontario Museum geochronology lab

Identify all polygons that contain sample points with apatite fission track cooling age values between X and Y Ma

METADATA

Dataset Metadata

What written literature is available about the area?

What portion of the geologic mapping shown on this area was funded by my agency?

What published geologic maps include the area?

Select parts of the map compiled from the original mapping of Smith (1946)

From what sources was this map element compiled?

What is the definition of this map unit?

What is the reliability and or data density in various parts of the map area?

What is the statistical error in the data and how is it calculated?

At what scale is the data valid?

What is the useable scale range of the data?

Is the data sufficient to provide a user geographic reference to locate themselves?

Who has done geologic mapping in North Carolina?

Who has done paleontological studies in North Carolina?

Select all references and map notes that were cited to compile the geology of a certain park

How detailed was the mapping compiled to produce the map?

Who did the geologic mapping, and when, using what set of aerial photographs?

Show me a listing of all previous mapping in and adjacent to quad X

Feature-Level Metadata

Are the geologic contacts interpreted from field observation, aeromagnetic maps, drilling data, etc?

Select polygons of unit X where the map-unit identification was made on the basis of outcrop examination

Select polygons of unit X where the map-unit identification was made on the basis of extrapolation, and tell me the basis for the identification (binoculars, aerial photos, TM imagery, etc.)

Select polygons of unit X where the map-unit identification is based on compiled sources, and identify the source

Select polygons of unit X where the map-unit identification is little more than a guess

How much field investigation was focused in this particular fault intersection?

From what sources was this map element compiled?

Who put these lines on the map? Are they reliable and at what scale?

How interpretive is this map, relative to "ground truth"?

Who mapped this contact?

Exactly how is the contact between the Escabrosa Limestone and Horquilla Limestone defined on this map?

Who measured that strike-and-dip?

Was the light any good when this measurement was made?

What facing indicator induced the geologist to put a ball on the end of the strike line?

Does a ball on the end of the strike line mean a facing indicator was observed and interpreted confidently?

How confident is the interpretation of facing direction at this site?

Was that contact seen on the outcrop, on an aerial photograph, or inferred by somebody sitting at a desk?

Select all references sited for quad X

METAMORPHIC ROCKS

Age

Metamorphic age

How was the metamorphic age determined?

Select all greenschist-facies rocks metamorphosed in late Cretaceous-early Paleogene time

Select all rocks metamorphosed in late Proterozoic time

Select rocks having two prograde metamorphic ages

Select rocks having mid-Proterozoic prograde upper amphibolite metamorphism followed by late Proterozoic retrograde metamorphism to greenschist facies

Display all rocks metamorphosed in late Proterozoic time

Protolith age

How was the protolith age determined?

Select protoliths of late Proterozoic age

Select protoliths of Paleozoic age

Lithology and composition

Select orthogneisses that have mylonitic fabrics and are intruded by alkalic plutonic and hypabyssal rocks of Triassic age

Select biotite schist that is coarse grained

Select chlorite schist that is fine to medium grained

Select quartzose hornfels that contains <5% biotite

Select actinolite-chlorite schist interlayered with muscovitic quartzofeldspathic schist

Rock type (classification)

Select all metamorphic rocks

Select all granulite-facies metamorphic rocks and charnockites

Select all cataclastic rocks

Select orthogneisses that have mylonitic fabrics and are intruded by alkalic plutonic and hypabyssal rocks of Triassic age

Select all contact metamorphosed zones containing marble or talc in Death Valley NP

Outcrop Geomorphology

Petrography and mineralogy

Where are mineral assemblages (of a specified type) on the map?

Select all occurrences of coexisting kyanite and sillimanite

Select biotite schist that is coarse grained

Select chlorite schist that is fine to medium grained

Select quartzose hornfels that contains <5% biotite

Select schist and gneiss containing porphyoblasts of cordierite

Select all metamorphic rocks that contain prograde hornblende

Select all metamorphic rocks that contain prograde muscovite

Select all metamorphic rocks that contain prograde garnet

Display the metamorphic isograds

Genetic structures

Select orthogneisses that have mylonitic fabrics and are intruded by alkalic plutonic and hypabyssal rocks of Triassic age

Select rock units that have deformational fabrics transitional between brittle and ductile

Select rock units that have cataclastic deformational fabrics and are cut by low-angle listric faults

Select rock units that display S-C indicators

Select rock units that have mylonitic deformational fabrics and display S-C indicators

Select rock units that have mylonitic deformational fabrics and also have mullion structures

Select domains of metamorphic rock in which the attitude of foliation is < 20° from the attitude of contact with next oldest unit

Genesis and origin

Display rocks having two prograde metamorphic ages

Where are there carbonate rocks metamorphosed to amphibolite facies?

Select areas of the granulite facies metamorphic terrane that have been affected by greenschist facies retrogressive metamorphism

Where are rocks metamorphosed to at least greenschist facies between 125 and 140 Ma?

Where are rocks metamorphosed to upper greenschist facies and higher?

Select metasedimentary rocks metamorphosed adjacent to plutonic intrusions

What is the diagenetic / metamorphic history of this region?

Do the map units represent original lithology (protolith), or are they metamorphic rock units?

Display rocks having mid-Proterozoic prograde upper amphibolite metamorphism followed by late Proterozoic retrograde metamorphism to greenschist facies

Protolith

Where are there carbonate rocks metamorphosed to amphibolite facies

Where are there carbonate rocks metamorphosed to amphibolite facies

Select marble that originally was chert-rich limestone

Select marble that originally was “pure” high-calcium limestone

Select marble that originally was high-magnesium dolostone

Select metaquartzite that originally was medium to coarse grained high-silica shore-face dune sand

Select Mesozoic orthogneiss containing porphyroclasts of potassium feldspar

Select greenschist-facies metasedimentary rocks that contain original sedimentary structures

Select orthogneiss units that preserve porphyritic fabric

Select greenschist-facies metasedimentary rocks that contain original sedimentary structures

Select orthogneisses that originated as monzogranitic high-level plutons

Select metagraywacke that originated as turbidite sands

Select argillite that originated as basin-plain siliceous mudrock

Select metachert

Select greenstone that originated as basalt flows

Select gneiss units that have sedimentary protoliths

Select all metamorphic rocks derived from felsic, igneous plutonic protoliths

Select all metamorphic rocks that have relict sedimentary structures

Stratigraphic relations

Select areas where the XYZ orthogneiss cross-cuts the XRAY schist

Select areas where the XRAY schist and the PQR greenstone appear to be depositionally stacked rather than structurally stacked

Tectonic or paleogeographic setting

Select metasedimentary terranes metamorphosed to blueschist conditions in subduction zones

Select metamorphic rocks formed in continental-collision zones

Where do metamorphic rocks occur beneath the XYZ thrust plate?

MINERALIZATION

Where is the indicator alteration and mineralization suggestive of a particular sort of mineralization (PCD, VMS, epithermal gold, etc.) ?

Select all units containing sulfide mineralization

MINERAL-RESOURCE QUERIES

Where is the indicator alteration and mineralization suggestive of a particular sort of mineralization (PCD, VMS, epithermal gold, etc.) ?

What is the mineral potential of that area?

Are all mineral occurrences indicated? Or only a subset?

Have all the mines pits and shafts been indicated?

Where should I target surface materials for federal highway-grade concrete aggregate?

What playa deposits lie within 50 km of Cenozoic epithermal gold systems?

Select mines in Miocene silicic volcanic rocks

Select gold mines in Jurassic rocks

Select all geologic units known to contain past or present sources of crushed stone (from mineral resource database) plus other units having similar characteristics

Select all greenschist-facies mafic volcanic rocks known to contain abandoned copper mines (from mineral resource database)

Select all granitic units that contain traces of molybdenite or molybdenite prospects (from mineral resource database)

What potential rip-rap sources lie within 20 km of a railroad?

Select abandoned surface mining sites in Pike Co., Kentucky

Select mine tailings within 3 m of a stream

Select all mines

Select phosphate deposits located upstream from cities greater than 50,000 population

Select Quaternary units having active sand and gravel quarries

Where can I find gold?

I'm a recreational gold panner, where can I go and be successful (and legal)?

Select gravel pits in southeastern Virginia and tell me the formation that is being mined

Select all the aggregate deposits within 100 km of a deepwater port

Select all abandoned mines in Mojave NP awaiting reclamation

Select all contact metamorphosed zones containing marble or talc in Death Valley NP

Select economic mineral potential locations of the commodity selenite in Capitol Reef NP

Select all active mines and/or wells in Nevada

Show areas of mineable sand and gravel deposits with x amount of till cover or lesslake plain areas with till vs. lacustrine sediments

Select faults that bound intrusive bodies and/or extend from faulted contacts of intrusive bodies

Select faults that cut hydrothermally altered intrusive rock

Select faults that intersect the boundaries of intrusive bodies

Are there economic mineral deposits? Where are they? How deep are they?

PALEONTOLOGY AND STRATIGRAPHY

Select fossil localities that conflict with age assignments of units

Select conodont localities in the Conococheague Limestone

Select all units containing Ordovician fossil localities

Select all faunal assemblages of Celtic faunal provinciality

Select all units of black shale whose known or suspected age coincides with some part of the Nemagraptus gracilis graptolite zone

Where is the best place to find fossils that I can get to?

Where are fossil locations (or radiometric ages) in "this" unit (and only this unit)?

Select all occurrences of the trilobite, Paradoxides davidis

Select Paleozoic rock units that contain fossils having Appalachian provincial affinities

Select Paleozoic rock units that contain fossils having Hercynian provincial affinities

Select Tertiary rock units that contain fossils having Tethyan provincial affinities

Select rock units containing trilobite faunas of the XYZ trilobite biomere of Palmer

Select marine sedimentary rocks containing benthic foraminiferal faunas of the Mohnian Stage

Select all NPS units in Utah containing Pennsylvanian rocks with fossils

Select all NPS units in Utah containing Pennsylvanian rocks with fossil clams

Select all sedimentary rocks which contain abundant, well preserved trilobite fossils

Develop a list of fossils identified in stratigraphic unit B in quad X

What is the relationship of the 'boundary' between these strata?

ROCK-STRATIGRAPHIC NOMENCLATURE

Select units underlain by Tyee Sandstone

Select units where the Tyee Sandstone is dipping west

Select units underlain by the Tertiary White River Group

Select all rocks of the Marquette Range Supergroup

Select all rocks of the Baraga Group

Select all rocks of the Michigamme Formation

Select all volcanic rocks of the Michigamme Formation

Select all mafic volcanic rocks of the Michigamme Formation

Select all volcanic rocks of Michigamme Formation that were deposited during continental breakup

Select the distribution of the Kope Formation in Butler and Hamilton Counties, Ohio

Select the distribution of the Black Hand Sandstone in Hocking County, Ohio

Select the location of all Columbus Limestone in Ohio that has 25 feet or less of glacial cover

Select the location of all abandoned Berea Sandstone quarries in Cuyahoga County, Ohio

Select all formations in the _____ Group

Select all members in the _____ Formation

Select all map units that consist of two or more units mapped undivided

Select conodont localities in the Conococheague Limestone

Select the maximum seaward extent of lower-shoreface units in the Ferron sandstone

Select names of all Eocene units

Select all occurrences of unit Tvb

Select all units and subdivisions of one or more named stratigraphic units (such as the Newark Supergroup, Great Smoky Group, or Ashe Metamorphic Suite)

Select the distribution of Formation Y and all its stratigraphic equivalents

Select the rock units in the map set, generalized at stratigraphic Group level or equivalent

Select the distribution of formation x, including all its members

I define the "Wasted" terrane as having these characteristics; Select where these criteria are met in this map area

Select map units in the area of (name of geographic feature)

Select all polygons mapped as (each map unit symbol in turn)

Select map units in the (northeast or other area of the map)

Select locations of the Hayden Lake stock

Generalize the map so that it is shows undivided Supergroups or Groups, but break out as a separate unit the felsic volcanic breccia in the Bimodal Member of the Volcano Formation of the Volcandseds Group

Select all units assigned to a given regional geologic "province," "belt," "zone," or "terrane" (such as Atlantic Coastal Plain Province, Kiokee belts, Carolina terrane, Avalon zone), adding symbols for mineral elongation and stretching lineations

Select the type section locality for the Anakeesta Formation

Select all map units that change rank term (for example, from Formation to Member) within the map area

Select the outcrop pattern of the Olentangy Shale in Delaware County, Ohio

Where is the Ashley Formation of shallow marine origin?

What percent of the Ashley is shallow marine?

Select some outcrops of the Gosport Sand in Alabama

Select a stratigraphic relationship of all the units exposed in the Grand Canyon and their textual descriptions

Select a picture of an outcrop of the shaly facies of the Brushy Basin Member of the Morrison Formation at Capitol Reef NP

Display a map showing the Darby till

Display a map showing the Powell end moraine

Display a map showing the boulder belts in the Darby till

Show the distribution of USCS classifications in the unconsolidated units

Show the extent of unit X in my study area

List stratigraphic names applied to bedrock and unconsolidated units for the selected area

Where does the Fox Hills Formation pinch out?

SEDIMENTARY ROCKS

Age

How was the age of this unit determined?

Select all units of black shale whose known or suspected age coincides with some part of the Nemagraptus gracilis graptolite zone

Select all sedimentary units that are less than 10,000 yrs old

Select places where Proterozoic clastic rocks are in the upper plate of a low-angle normal fault

Show all Tertiary basin-fill that is dominantly coarse-grained

Material name (classification)

Select all sedimentary rocks

Select sedimentary rocks classified according to Folk (1968)

Select sedimentary rocks classified according to Pettijohn ()

Select all Paleozoic sedimentary units that are predominantly composed of dolomite

Select all Paleozoic sedimentary units that are predominantly composed of dolostone

Select all limestones

Select all sandstones, etc. (make a list of primary rock types)

Select the location of all economic crushed-sandstone aggregate resources in Wayne National Forest in Ohio

Select all Tertiary deposits, marine or nonmarine, that consist mainly of sandstone, and re-select for those deposits dominated by well-sorted, clean sandstone

Select all Cretaceous sandstone deposits that have information about primary porosities

Select polygons of nonmarine sedimentary deposits where pebbly conglomeratic sandstone constitutes more than 50% of the map unit

Select shale that lies stratigraphically above Pennsylvanian limestone

Select units with Mesozoic sedimentary rocks at the surface

Select limestone units in areas that receive more than 20 inches annual precipitation

Select all limestone and marble units, as well as mapped sinkholes

Select granitic intrusions into limestone

Select limestone units adjacent to plutons

Select contacts between Laramide plutons and Mississippian Limestone

Select all Cambrian units that contain limestone

Select the felsic intrusive rocks younger that 65 Ma

Select Late Pliocene volcanic rocks (or sources)

Select map units consisting mainly of ironstone

Select that percent of the state directly underlain by limestone

Select areas of seafloor that are covered with gravel

Select areas of seafloor that are gravelly AND lie in water depths of less than 30 m

Select the interface between areas of rocky seafloor and muddy seafloor

Show me the thickness (isopach) of sand on the shoreface

Show me the distribution AND age of known lahar deposits in Washington

Select all the carbonate rocks within X km of a fault

Select all the clastic rocks that are not carbonate and that are part of a thrust plate

Select all carbonate rocks having > X% fine grained material

Select places where Proterozoic clastic rocks are in the upper plate of a low-angle normal fault

Show all Tertiary basin-fill that is dominantly coarse-grained

Select all carbonate rock that has been tectonically brecciated

Display all the contacts of the sand & gravel units that are in contact with the carbonate bedrock units

Query what percent of the state is directly underlain by limestone

Select shorelines having slopes > 35° formed on shale or mudstone

Select paved roads having slopes >2° on mudstone or shale

Do limestones form caverns? If so how large?

Where do sandstone aquifers come to the surface?

Outcrop geomorphology

What units have combined ledge-forming and slope-forming weathering profiles?

What crop out as recessive slope-formers?

What units crop out as prominent hogbacks?

What units crop out as resistant ledge- or cliff-forming units?

What units form badlands geomorphology?

Do limestones form karst terraines? If so what is the sink-hole density?

What are the bedding characteristics?

Lithology (physical properties) and composition

Select areas where diamictons less than 2 m thick overlie well bedded, well sorted deposits

Select where there is peat in contact with Pleistocene limestone in Florida

Select units with high-calcium limestone

Select all units of black shale whose known or suspected age coincides with some part of the *Nemagraptus gracilis* graptolite zone

Where do Cambrian sections contain more than 50% carbonate rock

In what units are chert and shale combined?

Select all units that contain fine-grained quartzite

Select sandstone outcrops with permeabilities over 1 md in aquifer recharge areas

Where does coarse sandstone underlie basalt lava flows of Miocene age

Select polygons where smectite-bearing mudrock dips steeper than 15 degrees

Select all white, coarsely crystalline limestone

Select thick-bedded sandstone that is reddish colored

Select units of thinly laminated to thin-bedded limestone interlayered with lenses of fissil shale

Select units consisting homogeneously of lenticular thick- to very thick-bedded sandstone and pebbly sandstone

Select units containing varved mudrock

Select units consisting mainly of bioclastic limestone

Select map units having containing conglomeratic sandstone containing mud chips

Select all sedimentary units with shear strengths (phi values) less than 35

Select all sedimentary units with cohesive strengths less than 500lb/square ft

Select all sedimentary units with bedding thickness less than 6 inches

Select all sedimentary units for which the dominant lithology (> 50%) is sand

Select all sedimentary units with more than 15% clay

Select the attitude data for all sedimentary units that have a bed thickness less than 1 foot

Select a picture of an outcrop of the shaly facies of the Brushy Basin Member of the Morrison Formation at Capitol Reef NP

Select areas where basaltic cobbles have been observed in the conglomerates of the Muddy Creek Formation

Select all fine-grained siliciclastic sedimentary rocks that are organic-rich

Select all sedimentary rocks which contain abundant, well preserved trilobite fossils

Select all sedimentary rocks deposited in intertidal depositional environments

Select all sedimentary rocks that are made up of turbidites

Select all sedimentary rocks that show evidence for syndepositional deformation

Select all sedimentary rocks that form massive, cliff forming units

Select all sedimentary rocks that are porous and permeable

Show all Tertiary basin-fill that is dominantly coarse-grained

Select all carbonate rocks with > X% fine grained material

ID all clay units (vertically and horizontally) having the following criteria: >25 % by weight maximum dimension of 0.002 mm; >50 % by weight passing 200-mesh sieve; and have a plasticity index > 10

Select all the clastic rocks that are not carbonate and that are part of a thrust plate

Select all carbonate rocks having > X% fine grained material.

ID all clay units (vertically and horizontally) with the following criteria: >25 % by weight max. dimension of 0.002 mm; >50 % by weight passing 200-mesh sieve; and have a plasticity index > 10

Show me all slopes with a grade steeper that 6% and the corresponding USCS classification

Query what percent of the state is immediately underlain by limestone

Select shorelines with slopes > 35° formed on shale or mudstone

Select paved roads with slopes >2° on mudstone or shale

Petrography and mineralogy

Select all units with sandstone containing more than trace amounts of glauconite

Select all sedimentary rocks that contain garnet

Select Tertiary nonmarine deposits of lacustrine origin that have gypsum or anhydrite greater than 5% by volume

Select polygons where smectite-bearing mudrock dips steeper than 15 degrees

Select all units containing arkosic wackes

Select all units that contain arkose

Select sandstones classified according to Folk (1968)

Selected sandstones classified according to Pettijohn ()

Select sandstones classified according to McBride ()

Select sandstones classified according to Friedman ()

Select sandstones classified according to Dickinson ()

Select carbonate rocks classified according to Dunham (1962)

Select carbonate rocks classified according to Bathurst

Select carbonate rocks classified according to Friedman

Select carbonate rocks classified according to Folk (1968)

Select map units containing limestones dominated by mud-supported depositional fabrics

Select map units containing limestones dominated by grain-supported depositional fabrics

Select map units dominated by sandstone having between-grain argillaceous “matrix”

Select all sand deposits in California NPS units

What are coal chemistry and physical characteristics?

Genetic structures

Select map units containing sandstones having eolian cross bedding

Select map units containing sandstones having graded bedding

Select map units containing sandstones having graded bedding and dominated by base-truncated Bouma BCD intervals

Select map units dominated by matrix-supported pebbly conglomerate and sandstones having graded bedding and Bouma AB intervals

Select map units containing sandstones having sole marks

Select map units containing conglomerate having matrix-supported depositional framework

Select map units containing sandstones having cross-laminations classified according to Allen ()

Select map units containing mudrock and fine sandstone displaying mudcracks

Select all turbidite units exhibiting groove casts

Select all carbonate rocks having > X% fine grained material.

Stratigraphic and structural relations

Select map units containing sedimentary fining-upward cycles

Select map units containing sedimentary coarsening-upward cycles

Select formation-rank map units in which coarse-sandstone dominated facies pass laterally into sandstone-and-mudrock facies without changing formation name

Select depositional contacts that overlie angular unconformities

Select units with sedimentary rocks that dip more than 25 degrees

Select shale that lies stratigraphically above Pennsylvanian limestone

Where does coarse sandstone underlie basalt lava flows of Miocene age

Select Tertiary nonmarine deposits where the mudrock:grainrock ratio is greater than 2:1

Select rock units in which the prevailing sandstone-body geometry is shoe-string sands

Select rock units in which the prevailing sandstone-body geometry is sheet sands

Select all the Cenozoic surficial deposits that are well sorted and unweathered within Xm of the surface

Select all the carbonate rocks within X km of a fault

Select all the clastic rocks that are not carbonate and that are part of a thrust plate

Select places where Proterozoic clastic rocks are in the upper plate of a low-angle normal fault

Select all carbonate rock that has been tectonically brecciated. (Again, this is an important question, that would rely on some sort of uniform criteria for characterizing "tectonic brecciation" -- otherwise it becomes highly subjective)

Display all the contacts of the sand & gravel units that are in contact with the carbonate bedrock units

Show the extent of unit X in my study area

Show the thickness of unit X in my study area

Show the depth to unit X in my study area

Display facies changes in formations/aquifers

Display a lithofacies map of the Pittsburgh sandstone member

Select bedding and foliation attitudes with dip > 30° and dip directions between 45° and 125°

Select polygons containing strata that strike > 20° toward a bounding basal depositional contact

Show the thickness of lacustrine deposits in study area

Show areas of known oilfield/brine contamination at X depth

Genesis and origin

Select 20 to 30 Ma lacustrine limestones that have orthogonal joint sets

Select all lacustrine beds that contain Lava Creek B tephra

Select map units consisting of turbidite deposits

Select evaporite deposits adjacent to modern rivers or lakes

Select geologic-map units that have middle Devonian limestone deposited in platform-margin environments

Select Cretaceous sandstone-mudrock sequences deposited in foreland high-sinuosity river plains

Select all marine mudrock deposits that accumulated in oxygen-deficient environments

Select the maximum seaward extent of lower-shoreface units in the Ferron sandstone

Select Tertiary nonmarine deposits of lacustrine origin that have gypsum or anhydrite greater than 5% by volume

Select marine deposits that formed in strand-plain or barrier-bar environments

Select Tertiary alluvial-fan deposits dominated by debris-flow depositional processes

Where is the Ashley Formation of shallow marine origin?

What percent of the Ashley Formation is shallow marine?

Select all debris-avalanche deposits

Select all tsunami deposits

Select all lahar deposits

Where can I find nonmarine Cretaceous rocks in South Carolina?

Where can I find shallow marine rocks in South Carolina?

Select Late Pliocene lacustrine beds

Select Neogene lacustrine deposits located east of the Sierra Nevada

Select the maximum extent of ejecta blankets associated with buried meteor impacts

Select all gradational contacts separating marine and terrestrial sediments

Show the extent of lacustrine deposits in study area

Show the thickness of lacustrine deposits in study area

Select areas of estuarine deposits

Show areas of beach ridge/dune deposits

Show basin delineations

Where are rocks deposited in a marine or non-marine environment?

What is the diagenetic / metamorphic history of this region?

What were the conditions of deposition?

Tectonic or paleogeographic setting

Select Cretaceous sandstone-mudrock sequences deposited in foreland high-sinuosity river plains

Select pull-apart basin deposits that accumulated within the San Andreas transform-fault system

Select Miocene submarine-fan deposits of Tertiary marine basins in the California Coast Ranges

Select Miocene submarine-fan deposits of Tertiary marine basins in the California Coast Ranges, but restrict the search to proximal-fan facies

Select Miocene submarine-fan deposits of Tertiary marine basins in the California Coast Ranges, but restrict the search to mid-fan facies

Select Mesozoic forearc nonmarine sedimentary deposits

Select Mesozoic forearc marine sedimentary deposits

Select Mesozoic back-arc deposits containing gravity-slide blocks

Select nonmarine flysch deposits

Select nonmarine molasse deposits

Show basin delineations

Show all Tertiary basin-fill that is dominantly coarse-grained.

STRATIGRAPHIC-SEQUENCING RELATIONS

Where does the Fox Hills Formation pinch out?

Select all units that are described as stacked (for example, silt over sand over gravel)

Select formation-rank map units in which coarse-sandstone dominated facies pass laterally into sandstone-and-mudrock facies without changing formation name

Select units underlain by Tyee Sandstone

Select all volcanic rocks of Michigamme Formation that were deposited during continental breakup

Select all intrusive contacts of late Cretaceous age

Select all landslide contacts

Select all depositional contacts that overlie angular unconformities

Select contacts separating non-intrusive bedrock units that are not in stratigraphic order

Select all unconformable contacts

Where does coarse sandstone underlie basalt lava flows of Miocene age

What map units contain gravel in their upper part

Select the unconformity separating Jurassic/Cretaceous from the Miocene units

What rock bodies (map units) overlie a particular angular unconformity

Select all polygons of the Right Formation and the Wrong Formation, where the two formations are in stratigraphic contact with each other

Select areas where the XYZ orthogneiss cross-cuts the XRAY schist

Select areas where the XRAY schist and the PQR greenstone appear to be depositionally stacked rather than structurally stacked

Display a structure contour map of the Precambrian unconformity in Ohio

Display a map showing the lowest most till in the Teays buried valley

Display a map showing all the Pre-Illinoian till

Select all the polygons that have three or more tills stacked upon each other

Find all the Pleistocene beach ridge sands that overly outwash sands & gravels

Display a map showing Loam Till with thin (<1 meter) loess cover

Display a map showing where the organic deposits, > 6 meters thick, overly till of Wisconsinian-age

Display a map showing lacustrine sand, deposited in glacial lakes as shallow-water deltas

Display a map showing where alluvium overlies till, which overlies sand & gravel in a buried valley

Display a map showing polygons where till is less than 2 feet thick and is overlying fine-grained sand

Display a map showing the polygons having two or more sand & gravel units, stack upon each other, separated by impermeable till units, and located within buried valleys

Show me the extent (vertical & horizontal) of unconsolidated deposits

Query depth to any given formation at a known location

What is the uppermost consolidated formation (or where is this location in the section)?

How do rocks in an arbitrary area relate to one another?

What is the relationship of the 'boundary' between these strata?

How does the lithology vary in depth and distance / direction?

Where do sandstone aquifers come to the surface?

TIME-STRATIGRAPHIC RELATIONS

Select all lacustrine beds that contain Lava Creek B tephra

Select all occurrences of Quaternary units

Select all Precambrian rocks

Select all Proterozoic rocks

Select all Early Proterozoic rocks

Select all (Quaternary, Pleistocene, Archean, etc.) map units

Select all sedimentary units that are less than 10,000 yrs old

Select all NPS units in Utah containing Pennsylvanian rocks

Select all NPS units in Utah containing Pennsylvanian rocks with fossils

Select all NPS units in Utah containing Pennsylvanian rocks with fossil clams

Select all national parks in the US containing exposures of Cambrian rocks

Display a map showing all the Pre-Illinoian till

List geological age assigned to map units in the selected area

UNCONSOLIDATED SURFICIAL MATERIALS

Age

Select all occurrences of Quaternary units

Select surficial deposits younger than 250,000 years that are cut by thrust faults

Select Holocene eolian silt deposits

Select Holocene bog or peat deposits

Select Holocene landslide deposits

Select all lacustrine beds that contain Lava Creek B tephra

Display a map showing Pre-Illinoian, Illinoian, and Wisconsinian lacustrine deposits

Display a map showing the Holocene-age alluvium and the Wisconsinian-age alluvial terraces

Deposit Type

Is there bedrock near the surface or are there unlithified surficial deposits?

Select all lacustrine beds that contain Lava Creek B tephra

Select all alluvial deposits except for alluvial-fan deposits

Select all hillslope materials and colluvium except those formed by sheet-wash processes

Select colluvial materials but not those formed by sheet-wash processes

Select all eolian deposits

Select loess deposits that are greater than 2 m thick

Select Holocene eolian silt deposits

What is under my house (or vacation property)? E.g., Rock type? Faults? Anything susceptible to landslides?

Select all landslide deposits

Select all the landslide deposits

Select all deep-seated landslides within a separately specified perimeter, such as a city boundary

Select Holocene landslide deposits

Select landslides in Clearwater Co., Idaho and separate by originating parent rock type

Select Holocene bog or peat deposits

Select where there is peat in Florida

Select organic-rich peat deposits in areas other than permafrost locations

Select all lacustrine deposits

Select the location of all Pleistocene lacustrine deposits in Muskingum County, Ohio

What playa deposits lie within 50 km of Cenozoic epithermal gold systems?

Select the distribution and thickness of colluvium derived from Pennsylvanian red claystones in Athens County, Ohio

Select all the debris flows with north aspects

Select all deposits related to glacial activity

Select all sandy glacial deposits

Select the location of all glacial bog deposits greater that 10 feet thick in Franklin County, Ohio

Where are the oldest glacial deposits?

Select the distribution of eskers greater that 2 km in length

Select all the areas of lodgement till, both at surface and below other surficial cover

Were there Pleistocene lakes in the area and where? Through which route did they drain?

Select all the organic terrane that is within the zone of discontinuous permafrost

Select all recent slope movements that occurred in areas mapped as ancient debris-fan deposits

Select all slope movements in the Potomac River drainage basin

Select the map polygons that are till

Select all areas of thick till

Select all clay-rich till

Select all end moraines and large recessional moraines

Select all the calcareous till

Select all glacial deposits

Select all till deposits

Select all outwash deposits

Select all drift deposits

Select all stream deposits

Select all fluvial deposits

Select all levee deposits

Select all flood deposits

Select all lacustrine deposits

Select all lake deposits

Select all gravel deposits

Select all sand deposits

Select all clay deposits

Select all debris flow deposits

Select all moraine deposits

Select Holocene lahars

Select Late Pliocene terrace deposits

Select all polygons mapped as landslides in the Simi Valley East 7.5 minute quadrangle prior to the 1994 Northridge earthquake

Select all polygons mapped as landslides in the Simi Valley East 7.5 minute quadrangle that were triggered by the 1994 Northridge earthquake

Select all terrace alluvium with calcrete soil > stage IV

Select all terrace alluvium deposits with upper surface between 10 and 20 m above stream level.

Select all eolian deposits more than 1 m thick that lack significant soil development

Select all areas that are within 2 km of and lower than landslide deposits having documented movement within the last 100 years

Select all the Cenozoic surficial deposits that are well sorted and unweathered within X m of the surface

Display a map showing the lowest most till in the Teays buried valley

Display a map showing the Pleistocene lacustrine silt that is well laminated

Select all the outwash sand & gravels that occur between two till units

Display a map of all the peat deposits

Display a map of all the till units that outcrop along the shore of Lake Erie

Display a map showing all the end moraines and the ground moraines

Display a map showing all the ice-contact deposits (deposited directly from stagnant ice as kame and esker deposits)

Display a map showing the Darby till

Display a map showing lacustrine sand, deposited in glacial lakes as shallow-water deltas

Display a map showing Pre-Illinoian, Illinoian, and Wisconsinian lacustrine deposits

Display a map showing the Powell end moraine

Display a map showing the boulder belts in the Darby till

Display a map showing the sand & gravel deposits in the buried valleys that are deeper that 400 feet beneath the surface

Show me all slopes with a grade steeper that 6% and the corresponding USCS classification

Show the extent of glacial sand & gravel deposits in study area

Show areas of mineable sand and gravel deposits with x amount of till cover or lesslake plain areas with till vs. lacustrine sediments

Show areas of beach ridge/dune deposits

Generate maps showing soils and soil infiltration rates

Display vertical hydraulic conductivity of surficial till deposits

What is the surficial material at this location?

Where are sand and gravel deposits out of floodplains?

Geomorphology

Select slope-movement scarps only in residual soil or colluvium developed over limestone

Select surficial deposits that have well-developed surface armor

Select surficial deposits that have depositional morphology preserved

Select surficial deposits that have no depositional morphology preserved

Select areas where younger alluvial fans slope more steeply than older ones

Show me the age of surficial materials on the shelf

Show me areas of Chesapeake Bay that are actively dredged

Show me all dredge-spoil disposal sites

Show me beaches in North Carolina that are eroding at rates of 1 m/yr or faster

Show me segments of beach that are stable or growing seaward

Select all the Cenozoic surficial deposits that are well sorted and unweathered within X m of the surface

Display a map showing all the eskers

Display a map showing all the end moraines

Display a map showing all the Wisconsinian-age Alluvial terraces

Display a map showing all the Pleistocene beach ridges bordering Lake Erie

Display a map showing the Holocene-age alluvium and the Wisconsinian-age alluvial terraces

Show areas where fracturing in till is known or suspected

Select bedrock mountain fronts with slopes > 35° more than adjacent piedmont slopes formed on surficial deposits

Pedogenic soils

What surficial materials have weak Av horizons?

Select all residual soil developed on southeast-facing slopes

Select all cryptogamic soils in this region

Select alluvial deposits that have buried soils

Select alluvial deposits having well developed argillic horizons

Select alluvial deposits having moderately developed K horizons

Select alluvial deposits having a strong K-IV horizon within 3 m of the surface

Select all terrace alluvium with calcrete soil > stage IV

Select all eolian deposits more than 1 m thick that lack significant soil development

What are the soil types in the area?

Lithology (physical description) and composition

Select all surficial material with particle-size distributions of more that 20% sand

Select all sandy glacial deposits

Select all units composed of clayey lodgement till

Select slope-movement scarps only in residual soil or colluvium developed over limestone

Select surficial deposits having fractures that are partly closed by caliche

Select surficial deposits that have clast populations dominated by carbonate rock, whether dolostone or limestone

Select all sand-and-gravel units that have greater than 7% silt

Select surficial deposits having average standard-penetration values less than N=20

Select surficial deposits with a shear-wave velocity less than 200 meters per second

Select all soils (and/or surficial sediments) with carbon contents > 3% in the upper 10 cm

Where are biota dependent on serpentine soils likely to and with what probability?

Select map units containing gravel in their upper part

Select all unconsolidated deposits that contain sand

What is the percent gravel in all surficial materials, incremented by 10%, between 25% and 75%?

Select the location of all sand deposits greater than 15 feet thick within 10 feet of the surface in Hamilton County, Ohio

Select all gravel deposits larger than 0.5 ha

Where will I likely encounter caliche within 1.5 m of the surface? 6 m?

Select unconsolidated sand and gravel deposits that overlie granitic rock

Select unconsolidated sand and gravel deposits located within 20 miles of cities greater than 50,000

Select all the locations where caliche (indurated carbonate or calcrete -here's an example of needing a common term) is within 3 m of the surface

In what surficial materials is silt>5% and eolian sand<5%?

Select all locations where the composition of surficial unit A (or all surficial units) is >50% quartz

Where are slightly consolidated surficial deposits? Moderately consolidated? Well consolidated?

Select sand and gravel units where the gravel:sand ratio exceeds 2:1

Select sand and gravel units where the average clast size is <5 cm

Select sand and gravel units where the gravel:sand ratio exceeds 2:1 and where the average clast size is <5 cm

Select sand and gravel units where the clasts consist of unweathered metavolcanics

Select sand and gravel units where the clasts are highly weathered granitic and metamorphic rocks

Select areas where steeply dipping sedimentary rocks are buried beneath less than 3 m of unconsolidated sediments

Select areas where diamictons less than 2 m thick overlie well bedded, well sorted deposits

Select all the Cenozoic surficial deposits that are well sorted and unweathered within X m of the surface

Display a map showing the Pleistocene lacustrine silt that is well laminated

Select all the till units that contain glacial erratics larger than 1 meter in diameter

Display a map showing Loam Till with thin (<1 meter) loess cover

Display a map showing lacustrine sand, deposited in glacial lakes as shallow-water deltas

Display a map showing where alluvium overlies till, which overlies sand & gravel in a buried valley

Display a map showing Pre-Illinoian, Illinoian, and Wisconsinian lacustrine deposits

Display a map showing polygons where till is less than 2 feet thick and is overlying fine-grained sand

Display a map showing the polygons having two or more sand & gravel units, stack upon each other, separated by impermeable till units, and located within buried valleys

Select all surficial deposits with a high/low infiltration rate

Show the unconsolidated units with a high/low total organic carbon content

Show the distribution of USCS classifications in the unconsolidated units

Show the extent of unconsolidated deposits with a permeability greater than XXX

Show the thickness of unconsolidated deposits with a permeability greater the XXX

Show the distribution of buried river channels/fluvial deposits in study area

Stratigraphy

Select where well data indicate alluvial thicknesses of 500 ft and greater;

Select the thickness of alluvium in the Red River reach from point A to point B (assuming these points could be digitally located)

What map units contain gravel in their upper part?

Select alluvial deposits more than 10 meters thick

Select units with less than 2 meters of unconsolidated surficial material

Select units with more than 5 meters of unconsolidated surficial material

Select the terminal moraine of the Miller Creek Formation

Select where there is less than 50 feet of glacial deposits on Middle Proterozoic mafic intrusive rocks

Select where there is peat in contact with Pleistocene limestone in Florida

In what areas will I likely find a debris-flow deposit within 2 m of the surface?

Select the location of all sand deposits greater than 15 feet thick within 10 feet of the surface in Hamilton County, Ohio

Select the distribution of Quaternary alluvium greater than 20 feet thick in Adams County, Ohio

Select the location of all gravel deposits greater than 15 feet thick that are more that 100 feet from the high water mark of the Great Miami River in Ohio

Select loess deposits that are greater than 2 m thick

Select the location of all glacial bog deposits greater that 10 feet thick in Franklin County, Ohio

Select all the Cenozoic surficial deposits that are well sorted and unweathered within X m of the surface

Display a map showing all the Pre-Illinoian till

Select all the polygons that have three or more tills stacked upon each other

Select all the outwash sand & gravels that occur between two till units

Display all the contacts of the sand & gravel units that are in contact with the carbonate bedrock units

Display a map showing Loam Till with thin (<1 meter) loess cover

Find all the polygons showing where the till is less than 5 feet thick over bedrock

Display a map showing lacustrine sand, deposited in glacial lakes as shallow-water deltas

Display a map showing where alluvium overlies till, which overlies sand & gravel in a buried valley

Display a map showing polygons where till is less than 2 feet thick and is overlying fine-grained sand

Display a map showing the boulder belts in the Darby till

Display a map showing the sand & gravel deposits in the buried valleys that are deeper that 400 feet beneath the surface

Display a map showing the polygons having two or more sand & gravel units, stack upon each other, separated by impermeable till units, and located within buried valleys

Show me the extent (vertical & horizontal) of unconsolidated deposits.

Show the extent of unconsolidated deposits greater than 3 m thick in study area

Show the thickness of lacustrine deposits in study area

Show the depth of Glacial sand & gravel deposits in study area

Show the distribution of buried river channels/fluvial deposits in study area

Show the depth to buried river channels/fluvial deposits in study area

Show areas of mineable sand and gravel deposits with x amount of till cover or lesslake plain areas with till vs. lacustrine sediments

Show areas where till, surficial deposits are believed to be saturated below X feet

Show drift-thickness maps

Select coarse-grained unconsolidated deposits >10' in thickness

Generate a map of buried valleys

What is the depth, thickness and potential yield of unconsolidated sand and gravel aquifers?

What is the thickness of unconsolidated deposits?

Where are tills or lake deposits less than 15 feet thick?

Genesis

Select alluvial-fan deposits where debris-flow deposition dominates over stream-flow deposition

Select lacustrine near-shore and bar deposits

Distinguish deposits of alpine glaciers from those of continental glaciers

Distinguish outwash-plain deposits from morainal deposits

Distinguish proximal alluvial-fan deposits from distal alluvial-fan deposits

Distinguish alluvial-valley deposits from alluvial-fan deposits

Distinguish braided-stream deposits from meander-belt deposits

Distinguish pro-delta deposits from delta-front deposits

Select all catastrophic flood deposits

Select the location of outwash deposits of the Chippewa lobe

Select ice flow directions within the Green Bay lobe

Select slope-failure deposits that consist of earthflows

Select slope-failure deposits that consist of slump blocks

Select slope-failure deposits of late Holocene age, irrespective of origin

What is the transport direction of eolian sand?

In what areas will I likely find a debris-flow deposit within 2 m of the surface?

Select Wisconsin moraines in Iowa and fit to a soil moisture map of Iowa

Select provenances of sand sources of the Arkansas River

Select all the marine clay

Select channels on alluvial fans active in the last 12,000 years

Display a map of all the peat deposits

Find all the Pleistocene beach ridge sands that overly outwash sands & gravel Display a map showing Pleistocene beach ridges that come in contact with the Lake Erie shoreline

Show areas of beach ridge/dune deposits

Where are sand and gravel deposits out of floodplains?